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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/750,047

12/31/2003

Randy Dale Curry

42173-017

2279

75474

7590

06/11/2010

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EXAMINER

CONLEY, SEAN EVERETT

ART UNIT

PAPER NUMBER

1797

MAIL DATE

DELIVERY MODE

06/11/2010

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/750,047	Applicant(s) CURRY ET AL.	
	Examiner SEAN E. CONLEY	Art Unit 1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 3/19/2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 50-60 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 50-60 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. The response filed March 19, 2010 has been received and considered. Claims 50-60 remain pending.

Response to Arguments

2. Applicant's arguments filed 3/19/2010 have been fully considered but they are not persuasive.

The Applicant argues the following on page 2 of the response:

"Spraying onto Contaminated Surface"

Bayliss is not about "spraying" at all. Accordingly, Bayliss is non-analogous.

Blidschun also fails to teach the claimed "spraying." Droplet transport in Blidschun is not by "spraying" but by convection of entrained droplets and by electrostatic attraction. Column 3, Lines 1-4 ("The electrostatic field causes the exceedingly small charged droplets which form the mist of sterilizing agent to be conveyed to the surface which is to be sterilized."). Accordingly, Blidschun is also non-analogous.

Peltier also fails to teach the claimed "spraying ... onto the contaminated surface." In Peltier, vapors and aerosols are released "into the air or air stream" so that the "molecules kinetically interact[] with the air molecules and airborne particles, such as dust." Column 8, Lines 46-51. There is not even a surface to be treated. Accordingly, Peltier is also non-analogous.

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The Examiner respectfully disagrees. Although Bayliss does not explicitly teach "spraying" that does not mean that it is non-analogous art. Bayliss teaches the application of a photosensitizer onto a contaminated surface and illuminating the surface with light to cause a chemical reaction (see rejection). Therefore the prior art of Bayliss is analogous art.

Blidshun does disclose spraying, contrary to the Applicant's argument. The electrically charged droplets of Blidshun et al. are charged and electrostatically deposited on the surfaces of the container to be sterilized (See col. 2, line 58 to col. 3, line 13). This is considered a form of spraying and therefore Blidshun is considered to be analogous art.

Peltier explicitly discloses release of charged vapors and aerosols directly onto the inner surfaces of ventilation system ductwork of a building or onto the surfaces of ventilation mechanical equipment in order to neutralize bacteria (see col. 2, lines 38-53; see col. 10, lines 43-53). Thus, the aerosols are sprayed by electrostatic discharge onto the surfaces of ducts and air handling equipment. Therefore, Peltier is considered to be analogous art.

The Applicant argues the following on pages 3-5 of the response:

"Droplets Greater than 50um"

Bayliss does not even mention the claimed "electrically charged" droplets or "droplets being greater than 50 um."

This argument is not persuasive. The Examiner never claimed that Bayliss explicitly disclosed droplets greater than 5um or charged droplets.

"Blidschun also fails to disclose the claimed "droplets being greater than 50 um," and indeed teaches away therefrom. Blidschun teaches use of ultrasonic energy "in order to provide .extremely small droplets." Column 2, Line 58-60. The droplets are "less than 10 um and preferably in the range of 2-4 um." Column 3, Lines 29-33. In Blidschun small interstitial areas remain unwetted between the extremely small droplets. Column 3, Lines 5-9 ("The small interstitial areas which remain between these exceedingly small droplets which in theory remain unwetted, do not offer the micro-organisms which are to be destroyed sufficient room to evade the sterilizing agent."). Blidschun expressly argues that large droplets of the prior art "in the range of 50-150 tam" do not have the benefit of such a small interstice. Column 3, Lines 17-24. Accordingly, Blidschun expressly teaches away from the claimed "droplets being greater than 50 um"

The above argument is also not persuasive. The Examiner never claimed that Blidschun et al. disclosed droplets greater than 50um nor has the Exmainer modified or relied upon Blidshun et al. to teach or suggest such a droplet size. Blidshun et al. has merely been relied upon to teach spraying a contaminated surface with an electrically charged photosensitizer.

Peltier also fails to disclose the claimed "droplets being greater than 50 um." Indeed, not only does Peltier fail to disclose this claimed feature, it in effect teaches away therefrom. Peltier uses a "vaporizing emitter" to provide "vapors and

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microaerosols" Column 2, Lines 38-41; Column 8, Lines 34-35. Although Peltier does not explicitly mention the range of the "vapors" or "microaerosols," the term "vapors" and "microaerosols" are believed to indicate their sizes to be small enough and Peltier's wick emitter would not expect to produce droplets larger than a few micrometers. In addition, contrary to the claimed droplets being sprayed "onto the contaminated surface," the vapors and aerosols in Peltier are intended to be released "into the air or air stream" so that the "molecules kinetically interact[] with the air molecules and airborne particles, such as dust." Column 8, Lines 46-51. Such vapors and aerosols to be released in to the air are believed to have to be small enough. Therefore, Peltier indeed teaches from the claimed "droplets being greater than 50 um."

This argument is also not persuasive as Peltier has not been relied upon to teach droplets greater than 50um. Furthermore, Peltier does not teach away from droplets greater than 50um because Peltier discloses spraying of microaerosols which includes aerosols on a micron scale.

"The Examiner contends that Berkeley "discloses that aerosol disinfectant surface sprays utilize particle diameters greater than 50 microns." However, Berkeley does not utilize particle diameters greater than 50 microns. Instead, Berkeley teaches "space sprays forming finely atomized mists or clouds." Column 3, Lines 50-51. In addition, Berkeley explicitly teaches away from the claimed droplets being greater than 50 um. Column 6, Line 55 ("a coarse droplet spray which is not desirable.") (Emphases added).

Accordingly, it is respectfully submitted that none of Bayliss, Blidschun, Peltier and Berkeley teaches the claimed "spraying electrically charged photosensitizer having aerosol droplets ... being greater than 50 um in diameter onto the contaminated surface." In addition, indeed Blidschun, Peltier and Berkeley teach away from the claimed "droplets being greater than 50 um in diameter."

The Examiner respectfully disagrees. Berkeley clearly discloses that disinfectant surface sprays utilize macroparticle sizes which are greater than 50um (see col. 1, line 65 to col. 2, line 5). Berkeley has not been relied upon for the teaching of space sprays forming finely atomized mist or clouds as suggested by the Applicant. Therefore, the claimed droplet size is taught in the prior art.

Even assuming, for arguments, that Berkeley teaches particle diameters greater than 50 microns as the Examiner contends, it would not have been obvious to combine Bayliss, Blidschun, Peltier and Berkeley to produce the claimed invention for the reasons set forth below."..." Because Blidschun and Peltier require droplet particles to be small in diameters ("less than 10 um" or "vapors and microaerosols") in electrically charged spray applications, the spraying of electrically charged droplets of Blidschun and Peltier cannot be modified or combined to incorporate droplet sizes greater than 50 um without fundamental change of operation.

Therefore, not only does Bayliss, Blidschun, Peltier and Berkeley fail to show the claimed "droplets being greater than 50 um," but Blidschun and Peltier indeed teaches away from the claimed combination of "spraying an electrically charged photosensitizer" and droplet sizes "greater than 50 um." Accordingly, it is respectfully submitted that

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Claim 50 and its dependent claims should be found allowable over Bayliss, Blidschun, Peltier and Berkeley.

The Examiner respectfully disagrees. The claimed droplet size is fully disclosed in the prior art (Berkeley) for applying a disinfect spray to a surface. Thus, it would have been obvious to one of ordinary skill in the art to modify the droplet size in the combination of Bayliss et al., Blidshun et al., and Peltier to greater than 50um, as exemplified by Berkeley, to yield the predictable result of adhering the droplets to the surface that is to be treated. Thus, the prior art suggests modifying the droplet size to larger droplets for surface adhesion. The principal operation of the prior art is not fundamentally changed as asserted by the Applicant.

Claims 54-55, 56, and 58-60 remain rejected for the same reasons stated in the previous office action and for the reasons stated above.

Claim Rejections - 35 USC § 103

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

4. Claims 50-53 and 57 are rejected under 35 U.S.C. 103(a) as being unpatentable over the non-patent literature, Bayliss et al., "The Combined Effect of Hydrogen Peroxide and Ultraviolet Irradiation on Bacterial Spores", Journal of Applied Bacteriology 47:263-269 (1979) in view of Blidschun et al. (U.S. Patent No. 4,680,163),

Peltier (U.S. Patent No. 5,382,410), and Berkley (U.S. Patent No. 3,832,459).

Regarding claim 50, Bayliss et al. teach a method of decontaminating a contaminated surface, the method comprising: applying a photosensitizer [a commonly known photosensitizer] onto the contaminated surface and illuminating the surface with light to cause chemical reactions to decontaminate the surface (see page 263 - ultraviolet (light) irradiation of spores of *Bacillus subtilis* in the presence of hydrogen peroxide produces a rapid kill which is up to 2000-fold greater than that produced by irradiation alone). Bayliss et al. fail to teach that the photosensitizer is electrically charged and fail to teach that the method of decontaminating a contaminated surface comprises spraying the photosensitizer as an aerosol with droplets being greater than 50 microns in diameter onto the contaminated surface of a person-occupiable space.

Blidschun et al. teach the use of a sterilizing agent, hydrogen peroxide, which is ultrasonically atomized to form a mist, e.g. for spraying, charged and subsequently directed to, e.g. spraying, the [contaminated] surface to be sterilized by an electrostatic field. The electrostatic field causes the exceedingly small charged droplets, which form the mist of the sterilizing agent to be conveyed to the surface (see col. 2, line 58 to col. 3, line 13).

Peltier teaches the controlled generation of electrically charged vapors and/or aerosols from liquids, which are then released directly into the air of a room, or onto the inner surfaces of ventilation system duct work of a building or onto the surfaces of a ventilation system mechanical equipment and/or to distribute the vapor/aerosols throughout a building through the ventilation system, e.g. onto contaminated surfaces of

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a person occupiable space - chairs, floors, rooms, etc., in an environment open to the person-occupiable space - within a building (see col. 2, lines 47-53). Peltier further teaches that the method adds disinfection agents, fungicides, bactericides, viruscides, and related formulates (see col. 2, line 65 to col. 3, line 1).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Blidschun et al. and Peltier with Bayliss et al. because Bayliss et al. teach the effectiveness of illuminating a photosensitizer, such as hydrogen peroxide, with ultraviolet light for killing bacteria spores on contaminated surfaces. Spraying an electrically charged photosensitizer from the combination of Blidschun et al. and Bayliss et al. onto a surface of a person- occupiable space, in an environment open to the person occupiable-space, e.g. into a room, enclosed space of any kind, or a building through the building air conditioning system, as exemplified by the method of Peltier, would allow for the adherence of the photosensitizer onto contaminated surfaces of person-occupiable spaces, e.g. chairs, tables, in rooms, etc., in an environment open to the person-occupiable space, in order to kill bacteria spores that may have contaminated these surfaces.

Furthermore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the droplet size in the invention of the combination of Bayliss et al., Blidshun and Peltier, and utilize aerosol droplets having a diameter greater than 50 microns in order to spray the aerosol disinfectant directly onto a surface to be treated as exemplified by the teaching of Berkeley whom discloses that aerosol disinfectant surface sprays utilize particle diameters greater than 50 microns.

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Regarding claim 51, Bayliss et al. teach the method of decontaminating a contaminated surface where the photosensitizer is a solution (see page 264 - 0.1M sodium phosphate buffer pH 7.0 and up to 2.5 g hydrogen peroxide/100 m), and the step of spraying the photosensitizer onto the contaminated surface comprises electrically charging at least one component of the solution (applying Blidschun's teaching and electrically charging the hydrogen peroxide component of the solution - see explanation above).

Regarding claim 52, Bayliss et al. further teach the method of decontaminating a contaminated surface further comprising controlling the temperature of the sprayed photosensitizer to enhance the formation rate, mobility, or the decontaminating activity of the photo-products and their ensuing reactions (see page 264 - sample temperatures were controlled by heating to 85°C and cooling in ice for at least 5 minutes).

Regarding claim 53, Bayliss et al. further teach the method of decontaminating a contaminated surface where the photosensitizer includes hydrogen peroxide (see page 263 - ultraviolet light) irradiation of spores of *Bacillus subtilis* in the presence of hydrogen peroxide - a common photosensitizer; see Applicant's Specification, page 7, lines 5-9 - produced a rapid kill which was up to 2000-fold greater than that produced by irradiation alone).

Regarding claim 57, Bayliss et al. further teach the method of decontaminating a contaminated surface where the light includes light of wavelengths between about 200 nm and about 320 nm (see page 263 - ultraviolet irradiation of the spores at wavelengths 254 nm).

5. Claims 54 and 55 are rejected under 35 U.S.C. 103(a) as being unpatentable over the non-patent literature, Bayliss et al. in view of Blidschun et al., Peltier, and Berkeley as applied to claim 50 above, and further in view of Horowitz et al. (U.S. Patent No. 5,232,844).

Bayliss et al. in view of Blidschun et al., Peltier, and Berkeley teach the method of decontaminating a contaminated surface as described above in paragraph 2, but fail to teach the step of illuminating the sprayed surface with a continuous beam.

Regarding claim 54, Horowitz et al. teach the illumination of a photosensitizer, such as phtalocyanine or psoralen with a continuous beam of ultraviolet light for a specific time, depending on the time of photosensitizer used for substantially inactivating a virus and resulting in a retention of intact cell functionality and structure of greater than 80% (see col. 5, lines 6-17; col. 8, lines 47-54). It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teachings of Horowitz et al. with Bayliss et al. in view of Blidschun et al., Peltier, and Berkeley for applying a continuous beam of ultraviolet light for illuminating a photosensitizer, such as hydrogen peroxide, because such application of continuous ultraviolet light causes the irradiation of spores of *Bacillus subtilis*, as taught by the non-patent literature Bayliss et al.

Regarding claim 55, Bayliss et al. further teach the method of decontaminating a contaminated surface where the light includes light of wavelengths between about 200

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nm and about 320 nm (see page 263 - ultraviolet irradiation of the spores at wavelengths 254 nm).

6. Claims 56 and 58 are rejected under 35 U.S.C. 103(a) as being unpatentable over the non-patent literature, Bayliss et al. in view of Blidschun et al., Peltier, and Berkeley as applied to claim 50 above, and further in view of Bowing et al. (U.S. Patent No. 4,051,058).

Bayliss et al. in view of Blidschun et al., Peltier, and Berkeley teach the method of decontaminating a contaminated surface as described above in paragraph 2, but fail to teach the photosensitizer including a surfactant which is a liquid carrier. Bowing et al. teach a stable peroxy-containing concentrate (also known as suitable photosensitizers) for the production of microbicidal agents characterized by a content of 0.5% to 20% by weight of a peracid (known photosensitizer), 25% to 40% by weight of hydrogen peroxide (known photosensitizer) - which have long term effects on disinfecting most microorganisms (see col. 3, lines 30-35), and other constituents (see col. 1, lines 50-58). Bowing further teaches that the stable peroxy-containing concentrate contains alkylbenzene sulfonates or alkyl sulfates (see col. 3, lines 46-53), e.g. surfactants. When applying photosensitizers, surfactants aid in the dispersion and coating of the photosensitizers to surfaces and act as a liquid carrier. Because the intention of Bayliss et al. in view of Blidschun et al., Peltier, and Berkeley provide for the adhesion of a photosensitizer, one that is electrically charged in the case of Blidschun et al., it would have been obvious for one of ordinary skill in the art to aid the dispersion and coating of

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a photosensitizer onto a contaminated surface by including a surfactant that is a liquid carrier, as taught by Bowing et al., into the photosensitizer to aid in the dispersion and coating of the photosensitizer on the surface being treated.

7. Claim 58 is rejected under 35 U.S.C. 103(a) as being unpatentable over the non-patent literature, Bayliss et al., "The Combined Effect of Hydrogen Peroxide and Ultraviolet Irradiation on Bacterial Spores", Journal of Applied Bacteriology 47:263-269 (1979) in view of Blidschun et al. (U.S. Patent No. 4,680,163), Peltier (U.S. Patent No. 5,382,410), and Berkeley as applied to claim 50 above, and further in view of Richter et al. (U.S. Patent No. 5,436,008).

Bayliss et al. in view of Blidschun et al., Peltier, and Berkeley fail to specifically teach a photosensitizer that includes solid or liquid carrier particles. Richter et al. discloses a sanitizing composition for treating inanimate surfaces such as food contact surfaces (see col. 1, lines 9-21). The composition comprising an antimicrobial agent can take the form of liquid solutions gels, aerosol and pump sprays or solids and is intended to sanitize and disinfect the contaminated surface (see col. 4, lines 50-64). The antimicrobial composition further contains a carrier to transport the antimicrobial agents to the intended surface of application and furthermore, the carrier may be used to maintain the antimicrobial agent on the intended surface for an extended period of time (see col. 7, lines 16-30). If the antimicrobial composition is a solution, dispersion, gel, emulsion, aerosol, or solid, useful carriers include water or aqueous systems as well as organic or inorganic based carriers (see col. 7, lines 38- 41). This reference has been

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relied upon to teach that it is well known to use liquid carrier particles when the antimicrobial composition to be dispersed is in the form of an aerosol.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the process of Bayliss et al. in view of Blidshun et al., Peltier, and Berkeley and include liquid carrier particles as taught by Richter et al. in order to enhance the dispersion of the antimicrobial agent to the intended surface that is to be treated since Richter et al. and the modified invention of Bayliss et al. both disclose processes for disinfecting contaminated surfaces using a solution that is sprayed onto the surface.

8. Claims 59 and 60 are rejected under 35 U.S.C. 103(a) as being unpatentable over the non-patent literature, Bayliss et al., "The Combined Effect of Hydrogen Peroxide and Ultraviolet Irradiation on Bacterial Spores", Journal of Applied Bacteriology 47:263-269 (1979) in view of Blidschun et al. (U.S. Patent No. 4,680,163), Peltier (U.S. Patent No. 5,382,410), and Berkeley as applied to claim 50 above, and further in view of Dingus et al. (U.S. Patent No. 5,670,469).

Regarding claim 59, Bayliss et al. in view of Blidschun et al., Peltier, and Berkeley fail to specifically teach the step of spraying the electrically charged photosensitized using a portable, field-deployable sprayer. Dingus et al. discloses a method of decontaminating a surface (1) by spraying a disinfectant solution onto a surface using a portable sprayer (4) (see figure 1A; col. 8, lines 34-40). Such surfaces include all types of military equipment, food storage containers, emergency equipment,

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hygiene facilities, etc. (see col. 7, lines 23-67). This reference has been relied upon to teach that it is well known in the art of surface sterilization to use a portable sprayer to dispense a disinfectant solution to a surface to be treated.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Bayliss et al. in view of Blidshun et al., Peltier, and Berkeley with the teachings of Dingus et al. and use a portable spraying device for dispensing the disinfectant solution onto other surfaces to be treated such as those described by Dingus et al. (military vehicles, hygiene facilities, etc.) in addition to the contaminated surfaces of food containers or air ducts.

Regarding claim 60, Bayliss et al. discloses the use of ultraviolet (UV) light to illuminate the photosensitizer that has been sprayed onto a surface (see page 263).

Conclusion

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sean E. Conley whose telephone number is 571-272-8414. The examiner can normally be reached on M-F 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill Warden can be reached on 571-272-1267. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

June 8, 2010

/Sean E Conley/
Primary Examiner, Art Unit 1797